FORM PCT 1390 REV. 5/93 — U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NO: WIRTZ ET AL-1 PCT

U.S. APPLICATION NO (if known, see 37 CFR 1.5): 10/069867

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE00/02136	JULY 5, 2000	AUGUST 27, 1999

TITLE OF INVENTION
A PLANAR STRUCTURAL ELEMENT MADE FROM METAL, PARTICULARLY FOR FILTRATION, AND A METHOD FOR PRODUCING A PLANAR STRUCTURAL ELEMENT AND FOR USING SUCH A PLANAR STRUCTURAL ELEMENT

APPLICANT(S) FOR DO/EO/US
PETER WIRTZ ET AL

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. X This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ___ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. X This is an express request to begin national examination procedures (35 U.S.C. 371 (f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(l).
4. X A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. X A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. X is transmitted herewith (required only if not transmitted by the International Bureau)
   b. ___ has been transmitted by the International Bureau.
   c. ___ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. X A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ___ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   a. ___ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ___ have been transmitted by the International Bureau.
   c. ___ have not been made; however, the time limit for making such amendments has **NOT** expired.
   d. ___ have not been made and will not be made.
8. ___ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ___ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ___ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. X An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ___ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. X A **FIRST** preliminary amendment.
    ___ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ___ A substitute specification.
15. ___ A change of power of attorney and/or address letter.
16. X Other items or information:

    PCT/ISA/210 - Int'l. Search Report (English)
    Certification of Translation
    2 SHEETS OF FORMAL DRAWINGS

Applicant Claims Priority under 35 U.S.C. §119 of GERMAN Application No. 199 40 792.4, filed: August 27, 1999.
Applicant Claims Priority under 35 U.S.C. §120 of: PCT No. PCT/DE00/02136, filed: July 5, 2000.

APPLICATION NO. (If known, see 37 CFR 1.5) 10/069867	INTERNATIONAL APPLICATION NO PCT/DE00/02136	ATTORNEY'S DOCKET NO WIRTZ ET AL-1PCT
_X_ The following fees are submitted. **Basic National Fee (37 CFR 1.492(a)(1)-(5)):** Search Report has been prepared by the EPO or JPO ..... **$890.00** International preliminary examination fee paid to USPTO (37 CFR 1.482) ..... **$710.00** Neither international preliminary examination fee paid (37 CFR 1.82) nor international search fee (37 CFR 1 445(a)(2)) paid to USPTO ..... **$1,040.00** International preliminary examination fee paid to USPTO (37 CFR 1 482) and all claims satisfied provisions of PCT Article 33(2)-(4)..... $100 **ENTER APPROPRIATE BASIC FEE AMOUNT =**	CALCULATIONS $ 890.00	PTO USE ONLY
Surcharge of **$130.00** for furnishing the oath or declaration later than ___ 20 ___ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).		

Claims	Number Filed	Number Extra	Rate		
Total Claims	13 - 20 =	- 0 -	X **$18.00**	$	
Independent Claims	1 - 3 =	- 0 -	X **$84.00**	$	
Multiple dependent claim(s) (if applicable)			+ **$280.00**	$	
TOTAL OF ABOVE CALCULATIONS =				$ 890 00	
Reduction by 1/2 for Small Entity status, if applicable.				$ 445.00	
SUBTOTAL =				$ 445 00	
Processing fee of **$130.00** for furnishing the English translation later than ___ 20 ___ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$	
TOTAL NATIONAL FEE =				$ 445.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3 31) **$40.00** per property +				See cover sheet attached to assign $ to be charged to Deposit Acct	
TOTAL FEES ENCLOSED =				$ 445.00	
				Amount to be refunded	$
				charged	$

_X_ Applicant claims Small Entity status.

a. _X_ A check in the amount of $ 445.00 to cover the above fees is enclosed.

b. ___ Please charge my Deposit Account No. 03-2468 in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. _X_ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment, to Deposit Account No. 03-2468. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:
COLLARD & ROE, P.C.
1077 Northern Boulevard
Roslyn, New York 11576-1696
(516) 365-9802

Signature

Edward R. Freedman, Reg. No. 26,048

Express Mail No. **EL 871 452 442 US**
Date of Deposit **February 26, 2002**

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" **service under 37 CFR 1.10, on the date indicated above, and is addressed to the Commissioner for Patents, BOX PCT APPLICATION, U.S. PTO, P.O. BOX 2327, ARLINGTON, VA 22202**

Lisa L. Vulpis

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: PETER WIRTZ ET AL

PCT NO.: PCT/DE00/02136 PCT FILED: JULY 5, 2000

PRIORITY: DE 199 40 792.4 PRIORITY FILED: AUGUST 27, 1999
U.S. 60/152,689 SEPTEMBER 7, 1999

TITLE: A PLANAR STRUCTURAL ELEMENT MADE FROM METAL, PARTICULARLY FOR FILTRATION, AND A METHOD FOR PRODUCING A PLANAR STRUCTURAL ELEMENT AND FOR USING SUCH A PLANAR STRUCTURAL ELEMENT

PRELIMINARY AMENDMENT

ATTN.: BOX PCT APPLICATION
Ass't. Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Preliminary to the initial Office Action, please amend the above-identified application as follows:

IN THE SPECIFICATION:

On Page 1, line 1, please insert the following paragraphs:

--CROSS REFERENCE TO RELATED APPLICATIONS

Applicant claim priority under 35 U.S.C. §119 of German Application No. 199 40 792.4, filed on August 27, 1999 and U.S. Application Serial No. 60/152,689, filed on September 7, 1999. Applicants also claim priority under 35 U.S.C. §120 of PCT/DE00/02136, filed on July 5, 2000. The international application under PCT article 21(2) was not published in English.--

IN THE SPECIFICATION:

On page 2, please replace the second complete paragraph with the following paragraph:

--A less expensive manufacturing process of a sieve suitable for depth filtration provides for metal filaments to be thermally sintered on a wire mesh before the planar structural element is rolled (see also NL-A-8 105 081). A planar structural element suitable for depth filtration is produced by this method also, however this has the disadvantage that the filaments cannot be joined in absolutely homogeneous manner, which causes fluctuations in the density distribution. As a result, the sieve cannot be aligned optimally, which in turn leads to compromises in determining the maximum pore size and filter area available for use.--

On page 2, after the third complete paragraph, please insert the following paragraph:

--DE OS 1 961 050 describes a planar structural element made from metal wires, in which internal fibres are arranged between metal wires, either twisted into a strand or as monofilaments. This promotes particular coarseness of the fibre surface, which is caused by the twisting of individual monofilaments or by the roughening of the surface of a single monofilament. However, such a

planar structural element can only be used for particularly coarse filtration, and a change to the structure as indicated in the citation would lead to the formation of larger slits. In particular, such cloths are not suited for use in depth filtration.--

On page 2, please replace the fourth complete paragraph with the following paragraph:

--The object of the invention is therefore to improve a planar structural element, particularly for filtration, such that optimal filtration results can be obtained with a planar structural element that is inexpensive to produce. This object is solved in that a metal fibre thread is introduced between metal wire, and in which a single capillary has a diameter less than 100 µm, preferably less than 30 µm, wherein a section through the metal fibre thread (5 to 12) is provided with more than 100, preferably more than 500 individual capillaries.--

On page 5, please delete the second complete paragraph.

A marked-up copy is attached.

IN THE CLAIMS:

Please cancel claims 1-15 and replace with new claims 16-28 as follows:

16. A cloth, net or mesh (1) made from metal, particularly for filtration, ***characterised in that*** a metal fibre thread (5 to 12) is worked in between metal wire (2 to 4) in which a single capillary has a diameter less than 100 µm, preferably less than 30 µm, wherein a section through the metal fibre thread (5 to 12) is provided with more than 100, preferably more than 500 individual capillaries.

17. The cloth, net or mesh according to claim 16, ***characterised in that*** the metal fibre thread (5 to 12) has a larger diameter than the metal wire (3 to 4).

18. The cloth, net or mesh according to claim 16, ***characterised in that*** the metal wire (2 to 4) is woven together with the metal fibre thread (5 to 12).

19. The cloth, net or mesh according to claim 18, ***characterised in that*** the metal wire (2 to 4) constitutes the warp, and the metal fibre thread (5 to 12) the weft of a cloth.

20. The cloth, net or mesh according to claim 16, ***characterised in that*** the metal wire (2 to 4) is a monofilament wire.

21. The cloth, net or mesh according to claim 16,

characterised in that the metal wire (2 to 4) forms a smooth surface (13, 14).

22. The cloth, net or mesh according to claim 16, ***characterised in that*** the cloth, net or mesh (1) is furnished with a support layer (15) consisting of metal wire (16 to 19), preferably monofilament wire.

23. The cloth, net or mesh according to claim 16, ***characterised in that*** metal wire (22), preferably monofilament wire holds the cloth, net or mesh (1) together.

24. A method for producing a cloth, net or mesh, especially in accordance with claim 16, ***characterised in that*** a metal fibre thread (5 to 12) encased in a skin is woven together with a metal wire (2 to 4) to make a cloth, and the skin is removed subsequently.

25. The method according to claim 24, ***characterised in that*** the skin is removed with a liquid.

26. The method according to either of claim 24, ***characterised in that*** the cloth is welded to a solid body.

27. The method according to any of claim 24,

characterised in that stainless steel is used for the metal fibre thread (5 to 12) and for the metal wire (2 to 4).

28. The use of a cloth, net or mesh in accordance with claim 16 for depth filtration.

REMARKS

By this Preliminary Amendment, the application has been amended to conform with U.S. practice, the cross-reference to the related application has been inserted on page 1. Also, claims 1-15 have been replaced by new claims 16-28. No new matter has been introduced.

Entry of this amendment is respectfully requested.

Respectfully submitted,

PETER WIRTZ ET AL

COLLARD & ROE, P.C.
1077 Northern Boulevard
Roslyn, New York 11576
(516) 365-9802

Allison C. Collard, Reg. No. 22,532
Edward R. Freedman, Reg. No. 26,048
Attorneys for Applicants

Express Mail No. EL 871 452 442 US
Date of Deposit February 26, 2002

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Lisa L. Vulpis

Lisa L. Vulpis

Marked-up Version of Prior Pending Paragraphs

Showing the Changes Made

On page 2, please replace the second complete paragraph with the following paragraph:

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10/069867
28 May 2002

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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PCT NO.: PCT/DE00/02136 PCT FILED: JULY 5, 2000

PRIORITY: DE 199 40 792.4 PRIORITY FILED: AUGUST 27, 1999
U.S. 60/152,689 SEPTEMBER 7, 1999

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IN THE CLAIMS:

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17. The cloth, net or mesh according to claim 16, ***characterised in that*** the metal fibre thread (5 to 12) has a larger diameter than the metal wire (3 to 4).

18. The cloth, net or mesh according to claim 16, ***characterised in that*** the metal wire (2 to 4) is woven together with the metal fibre thread (5 to 12).

19. The cloth, net or mesh according to claim 18, ***characterised in that*** the metal wire (2 to 4) constitutes the warp, and the metal fibre thread (5 to 12) the weft of a cloth.

20. The cloth, net or mesh according to claim 16, ***characterised in that*** the metal wire (2 to 4) is a monofilament wire.

21. The cloth, net or mesh according to claim 16,

characterised in that the metal wire (2 to 4) forms a smooth surface (13, 14).

22. The cloth, net or mesh according to claim 16, ***characterised in that*** the cloth, net or mesh (1) is furnished with a support layer (15) consisting of metal wire (16 to 19), preferably monofilament wire.

23. The cloth, net or mesh according to claim 16, ***characterised in that*** metal wire (22), preferably monofilament wire holds the cloth, net or mesh (1) together.

24. A method for producing a cloth, net or mesh, especially in accordance with claim 16, ***characterised in that*** a metal fibre thread (5 to 12) encased in a skin is woven together with a metal wire (2 to 4) to make a cloth, and the skin is removed subsequently.

25. The method according to claim 24, ***characterised in that*** the skin is removed with a liquid.

26. The method according to either of claim 24, ***characterised in that*** the cloth is welded to a solid body.

27. The method according to any of claim 24,

characterised in that stainless steel is used for the metal fibre thread (5 to 12) and for the metal wire (2 to 4).

28. The use of a cloth, net or mesh in accordance with claim 16 for depth filtration.

REMARKS

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Lisa L. Vulpis

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On page 2, please replace the fourth complete paragraph with the following paragraph:

--The object of the invention is therefore to improve a planar structural element, particularly for filtration, such that optimal filtration results can be obtained with a planar structural element that is inexpensive to produce. This object is

solved in that a metal fibre thread is introduced between metal wire[.] and in which a single capillary has a diameter less than 100 µm, preferably less than 30 µm, wherein a section through the metal fibre thread (5 to 12) is provided with more than 100, preferably more than 500 individual capillaries.--

A planar structural element made from metal, particularly for filtration, and a method for producing a planar structural element and for using such a planar structural element.

The invention relates to a planar structural element made from metal, particularly for filtration, and a method for producing a planar structural element and for using such a planar structural element.

Planar structural elements made from metal cloth are used mainly for filtration and in conveyor belts. In both applications, the cloth is required to have a particularly fine surface and high stability. The difficulty in both cases is that particularly fine wires must be used to achieve a particularly small pore size, but the fine metal cloths produced therewith are not highly robust.

In order to achieve adequate stability of the planar structural element despite this, fine filter layers are attached to a coarser support layer. In this way, it is possible to combine a high degree of stability of the filter cloth with an extremely fine pore size distribution.

However, the disadvantage of such cloths has been shown to be that the surface pores easily become clogged, with the result that the sieving function is impaired.

This problem may be solved by making the change from surface filtration to depth filtration. For this, multiple fine filter cloth layers are placed on top of one another so that the particles are trapped at different distances as they pass through the layers of fine cloth. This means that sieves may remain in service for longer because the sieve is not clogged until all the sieving layers are blocked.

However, the manufacture of such sieves, consisting of multiple layers of fine cloth, involves much effort, since multiple layers of cloth must be manufactured and bonded together.

A less expensive manufacturing process of a sieve suitable for depth filtration provides for metal filaments to be thermally sintered on a wire mesh before the planar structural element is rolled. A planar structural element suitable for depth filtration is produced by this method also, however this has the disadvantage that the filaments cannot be joined in absolutely homogeneous manner, which causes fluctuations in the density distribution. As a result, the sieve cannot be aligned optimally, which in turn leads to compromises in determining the maximum pore size and filter area available for use.

Sintered planar structural elements have the further disadvantage that they must be heated in furnaces, and these furnaces only have special dimensions. For example, standard furnaces have a width of 600 mm or 1200 mm and are therefore too small for the production of widths of 3000 mm. Consequently, in practice multiple panels are welded together. The result of this, however, is the loss of usable filter area and unevennesses on the surface of the planar structural element.

The object of the invention is therefore to improve a planar structural element, particularly for filtration, such that optimal filtration results can be obtained with a planar structural element that is inexpensive to produce. This object is solved in that a metal fibre thread is introduced between metal wire.

The term metal fibre thread is used to describe a filamentous product prepared by spinning fibres. The fibres used in this process may be a bundle of extremely long spun

fibres. However, they may also be broken off or cut short and twisted into a thread. Metal fibre threads are preferably made from many twisted fibres, and an extremely wide variety of threads can be produced depending on the diameter of the fibres, length of fibres and type of twisting or subsequent treatment of the thread.

On the other hand, the term metal wire is used to describe a wire that is produced from bars by wire drawing or rolling.

The combined effect of metal wire and metal fibre thread has the great advantage that the metal fibre thread disposed between the metal wire is in a protected situation so that it can, for example, perform the function of depth filtration. However, the planar structural element also has special acoustic properties and high flexibility, which render it suitable for use in a very wide range of applications.

When the planar structural element according to the invention is used for filtration, the metal fibre thread serves as the filtering element for depth filtration, while the metal wire protects the metal fibre thread from mechanical impairments and improves drainage of the metal fibres. The wire is in contact with the metal fibre thread, and thus improves the wicking of liquid from the thread to provide optimum drainage.

It is advantageous if the metal fibre thread has a larger diameter than the metal wire. The effect of depth filtration, for example, may be improved for filtration by increasing the proportion of thread, whereas a metal wire of smaller diameter is sufficient to fulfil the functions of drainage and protection.

The planar structural element may take the form of a braid, netting, or similar. A simple configuration is produced by weaving the metal wire together with the metal fibre thread. In this way a cloth is obtained that combines the advantages of a wire fabric with those of the metal fibre thread tissue.

It has proven particularly advantageous for the production of such cloths if the metal wire constitutes the warp and the metal fibre thread the weft of the cloth. In this way, the metal fibre thread is arranged in protected manner in the cloth, and ideally has no crease marks, which may cause the thread in part to be excessively compressed.

Good experimental results were achieved by using a monofilament wire as the metal wire. The monofilament wire is easily worked and is particularly well suited for drainage of the planar structural element.

It is advantageous if the planar structural element is conformed so that the metal wire lends a smooth surface to the planar structural element. This smooth surface can be cleaned simply by mechanical means and allows a planar structural element to be produced with low layer thickness.

Depending on the application, it may be the case that the planar structural element described is not sufficiently robust. In such event, it is suggested that the planar structural element be provided with a support layer of metal wire, preferably monofilament wire. This support layer, which is preferably applied to one side of the cloth, may for filtration purposes be coarse enough to allow the filtrate to pass unhindered through the support layer. However, a very wide range of support layer types is possible depending on the application.

Particularly when a support layer is used, it is suggested that the planar structural element be held together by a metal wire, preferably a monofilament wire. This wire should be worked into the planar structural element in such manner that the surface of the planar structural element remains smooth.

A preferred embodiment provides that a section through the metal fibre thread consists of more than 100, preferably more than 500 individual capillaries, a single capillary having a diameter less than 100 µm and preferably less than 30 µm.

The object according to the invention is also solved by a method for producing a planar structural element, in which a metal fibre thread encased in a skin is woven into a cloth with a metal wire and the skin is subsequently removed.

It has been shown that metal fibre threads are not easily woven, and there is a danger that they may be damaged during the weaving operation. It is further proposed according to the invention, therefore, that the metal fibre thread be encased in a skin before weaving, and that this skin be removed when the weaving operation is complete. The skin holds the individual fibres of the thread together and provides a smooth surface, which facilitates weaving.

One variant of the method provides for the removal of the skin with the aid of a liquid. For example, paraffin may be used as the skin, and my be rinsed off with warm water at a temperature of 60 °C.

Since the planar structural element according to the invention is made entirely from metal, it is easily weldable, and so it is proposed to weld the tissue to a

solid body. In this way, conical filtering surfaces, filter discs or any other filtration bodies may be produced.

The use of stainless steel for the metal fibre thread and the metal wire is especially proposed for applications in the food industry.

A particularly preferred field of use for the planar structural element of the invention is depth filtration.

The drawing illustrates a preferred embodiment of the invention, which is described in detail in the following. In the drawing:

Fig. 1 is a view of a lateral surface of the planar structural element,

Fig. 2 is a bottom view of the planar structural element,

Fig. 3 is a view of the opposite side of the planar structural element,

Fig.4 is another view of the planar structural element, and

Fig. 5 is an enlarged section of the view in Fig. 3.

Planar structural element 1 shown in the figures consists of a multiplicity of metal wires 2, 3, 4, which are woven together with a metal fibre thread 5, the monofilament metal wires 2, 3, 4 forming the warp, and the metal fibre thread forming the weft. By way of example, Fig. 3 clearly shows the distance at which multiple metal fibre thread strands 5, 6, 7, 8, 9, 10, 11, 12 are arranged with respect to one another, and the monofilament metal wires, for example monofilament metal wire 3, pass alternately over two metal fibre threads, 6, 7, and then under two metal fibre threads, 8, 9. Since the adjacent metal wire 4 follows the pattern at a remove of one metal fibre thread 6, first passing over two metal fibre threads 7 and 8, and

then under two metal fibre threads 9 and 10, the separation between the metal fibre threads is maintained by the interposed metal wires.

Metal fibre threads 5, 6, 7, 8, 9, 10, 11, 12 arranged in parallel form a plane, and the surfaces of metal wires 2, 3, 4 form parallel surfaces 13 and 14 above and below this plane.

Upper surface 13 is particularly smooth so that it may be cleaned easily, and lower surface 14 serves for the application of a support layer 15. Support layer 15 itself consists of a cloth made from metal wires 16, 17, 18, 19, which is arranged below the cloth layer described previously and is composed of metal wires 16 to 19 having a larger diameter than metal wires 2, 3, 4 described previously.

In the example shown, the cloth consisting of metal wires 2, 3, 4 and metal fibre thread 5 to 12 forms filtration layer 20, and the cloth with the thicker metal wires 16 to 19 forms protective layer 15. Protective layer 15 is attached to filter layer 20 by relatively thin metal wires 21, 22.

The cooperative relationship between metal wires 2 to 4 and metal fibre thread 5 to 12 in creating a solid structure is revealed in Figs. 2 to 5, and particularly in a consideration of all Figs. together. The exact path of the individual wires, which is an essential element of the invention, will be clear to one versed in the art.

The Figs represent an enlargement of the cloth. In particular, Fig. 5 shows that metal fibre thread 5 consists of metal fibre thread strand made up of many individual capillaries 23.

Metal fibre thread strand 5 is disposed between monofilament metal wires 2, 3 and 4 of the warp and completely fills the cavities formed by the warp. This is clearly shown in the eye-shaped section of metal fibre thread strand 5 in Fig. 5.

In practice, the tissue is designed for a filter mesh of about 1 µm to 200 µm.

The metal fibre threads used are made up of more than 500 individual capillaries each having a diameter less than 30 µm, and the fineness of this material means that the thread may easily be damaged during weaving. Therefore, each fibre is first coated with a film of paraffin prior to weaving. The paraffin film eases the weaving operation and protects the tissue. The paraffin film may be rinsed off subsequently with warm water at a temperature of 60 °C, so that the filtration properties of the metal fibre thread are restored.

The planar structural element produced in this manner is then usually welded to create filter discs or other filter elements depending on the application. The availability of particularly wide looms for working metal wires enables the production of cloth widths several metres wide, which are suited to an extremely wide range of applications.

CLAIMS

1. A planar structural element (1) made from metal, particularly for filtration, ***characterised in that*** a metal fibre thread (5 to 12) is worked in between metal wire (2 to 4).

2. The planar structural element according to claim 1, ***characterised in that*** the metal fibre thread (5 to 12) has a larger diameter than the metal wire (3 to 4).

3. The planar structural element according to any of the preceding claims, ***characterised in that*** the metal wire (2 to 4) is woven together with the metal fibre thread (5 to 12).

4. The planar structural element according to claim 3, ***characterised in that*** the metal wire (2 to 4) constitutes the warp, and the metal fibre thread (5 to 12) the weft of a cloth.

5. The planar structural element according to any of the preceding claims, ***characterised in that*** the metal wire (2 to 4) is a monofilament wire.

6. The planar structural element according to any of the preceding claims, ***characterised in that*** the metal wire (2 to 4) forms a smooth surface (13, 14).

7. The planar structural element according to any of the preceding claims, ***characterised in that*** the planar structural element (1) is furnished with a support layer (15) consisting of metal wire (16 to 19), preferably monofilament wire.

8. The planar structural element according to any of the preceding claims, ***characterised in that*** metal wire

(22), preferably monofilament wire holds planar structural element (1) together.

9. The planar structural element according to any of the preceding claims, ***characterised in that*** a section through the metal fibre thread (5 to 12) comprises more than 100, preferably more than 500 individual capillaries.

10. The planar structural element according to any of the preceding claims, ***characterised in that*** an individual capillary has a diameter less than 100 µm, preferably less than 30 µm.

11. A method for manufacturing a planar structural element, particularly according to any of claims 1 to 10, ***characterised in that*** a metal fibre thread (5 to 12) encased in a skin is woven together with a metal wire (2 to 4) to form a cloth, and the skin is then removed.

12. The method according to claim 11, ***characterised in that*** the skin is removed using a liquid.

13. The method according to either of claims 11 or 12, ***characterised in that*** the cloth is welded to a solid body.

14. The method according to any of claims 11 to 13, ***characterised in that*** stainless steel is used for the metal fibre thread (5 to 12) and for the metal wire (2 to 4).

15. Use of a planar structural element in accordance with any of claims 1 to 10 for depth filtration.

ABSTRACT

In a planar structural element made from metal that is used particularly for filtration, a metal fibre thread is worked between the metal wire. Whereas the metal wire provides the planar structural element with sufficient sturdiness, metal fibre thread is an excellent material for depth filtration. The metal wire is preferably woven together with the metal fibre thread to form a cloth, wherein the metal fibre thread is the weft and the metal wire the warp.

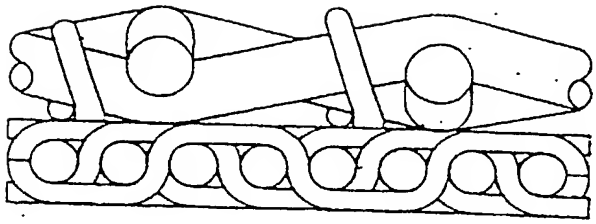

Fig. 1

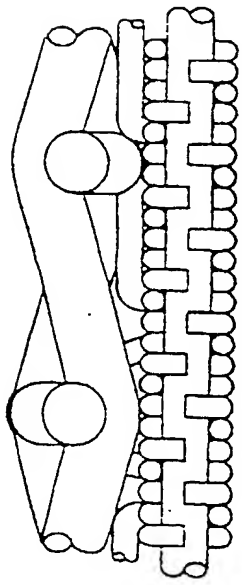

Fig. 4

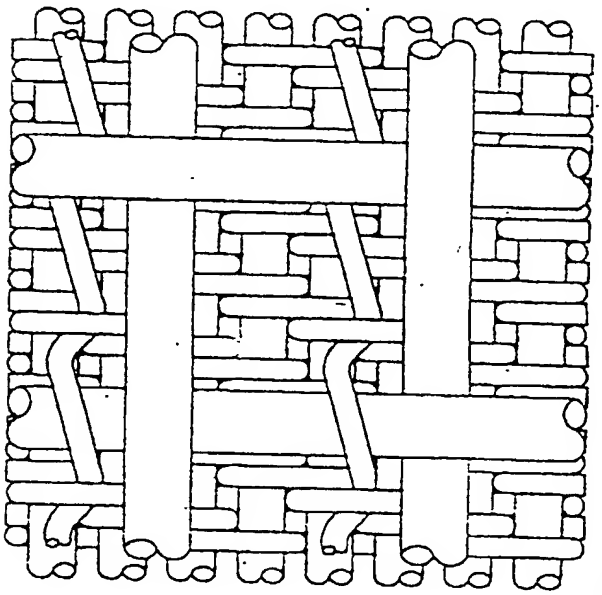

Fig. 2

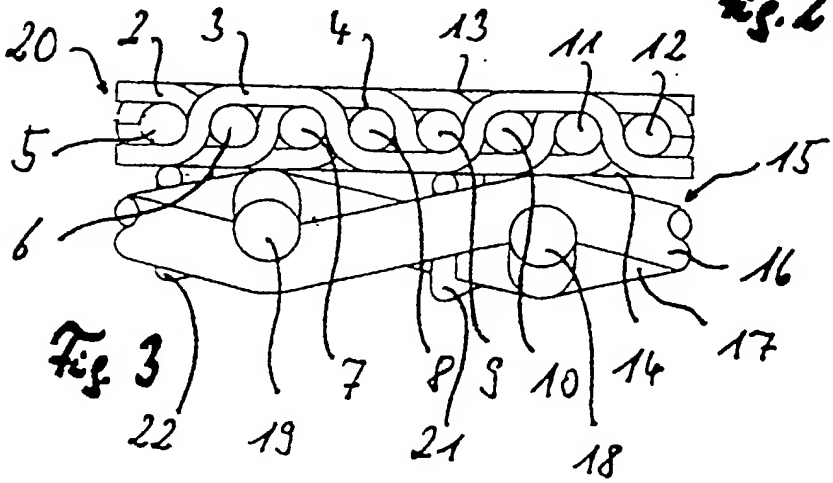

Fig. 3

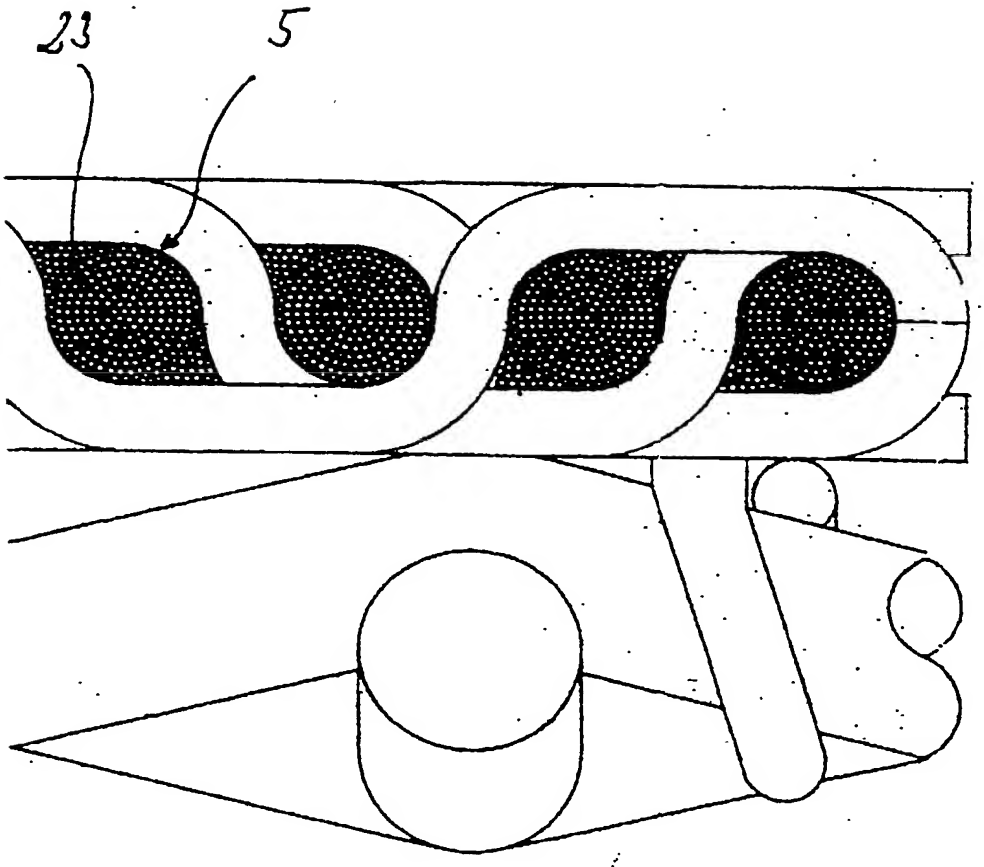

Fig. 5

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NUMBER
WIRTZ ET AL-1 PCT

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

A PLANAR STRUCTURAL ELEMENT MADE FROM METAL, PARTICULARLY FOR FILTRATION, AND A METHOD FOR PRODUCING A PLANAR STRUCTURAL ELEMENT AND FOR USING SUCH A PLANAR STRUCTURAL ELEMENT

the specification of which (check only one item below):

[ ] is attached hereto.

[ ] was filed as United States application

Serial No. _____

on _____,

and was amended

on _____ (if applicable).

[X] was filed as PCT international application

Number PCT/DE00/02136

on 5 JULY 2000,

and was amended under PCT Article 19

on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 U.S.C. 119
GERMANY	199 40 792.4	27 AUGUST 1999	[X] YES [ ] NO
			[ ] YES [ ] NO
			[ ] YES [ ] NO
			[ ] YES [ ] NO

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NUMBER
WIRTZ ET AL-1 PCT

I hereby claim the benefit under Title 35, United States Code, Section 119(e) of any United States provisional application(s) listed below.

60/152,689	7 SEPTEMBER 1999
(Application Number)	(Filing Date)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclose in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS		STATUS (Check One)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.

PCT APPLICATION NO.	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED (if any)			

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201	SIGNATURE OF INVENTOR 202
DATE 26.03.2002	DATE 26.03.2002